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Genetic Covariances among Relatives for Dairy Lactation Records

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SUMMARY

Trios of first lactation records of a cow, her dam, and her granddam were analyzed in an attempt to distinguish between additive by additive genetic effects and maternal genetic effects as possible explanations of much higher heritability estimates from daughter–dam regression than from paternal half–sib correlations. The results based on first lactation records expressed as deviations from herdmate averages suggest that additive by additive effects, and probably environmental correlation contribute little or nothing to covariance between daughter and dam records. Genetic maternal effects may account for about 20% and direct additive genetic effects for 23% of within–herd variance for first lactation records expressed as deviations. The method of using deviations, however, may cause an automatic environmental correlation between the daughter and dam records. Other evidence, however, suggests that this might not be an important reason for the increase in daughter–dam covariance for deviations. Analyses of mature equivalent records of artificially sired cows, however, gave the conflicting impression that genetic maternal effects were not important and that additive genetic variance accounted for about 4.0% of the within herd variance. Confounding of year and sire effects, however, may have caused the increase in four times the paternal half–sib correlation to the same magnitude as twice the daughter–dam regression.